MCT 4334

Embedded System Design

Week 00 Administration

About the instructor

Assoc. Prof. Dr. Zaw Zaw Htike @ Md. Yusof. Abd. Ghafur

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- E-Mail : zaw@iium.edu.my
- Room No: E1-5-2.12
- Consultation hours related to this course:
  - Monday and Wednesday (11:30am to 1pm and 2pm to 3:30pm)
- Lecture materials available on Italeem

Programme outcome (PO)

&

Programme Educational Objectives (PEO) :

Kulliyyah of Engineering, IIUM

What are PO and PEO ?

- Programme Outcomes (POs) are statements that describe what students are expected to know and be able to perform or attain by **the time of graduation**. These relate to the skills, knowledge, and behaviour that students acquire through the programme.

- Programme Objectives (PEOs) are specific goals consistent with the mission and vision of the IHL, are responsive to the expressed interest of programme stakeholders, and describe the expected achievements of graduates in their career and professional life a **few years after graduation**.

What are the POs of KOE ?

The program learning outcomes are grouped into 5 general areas to identify the nature of the skills and capability involved. These groups are:

- **Technical (T) – essential capabilities related to traditional scientific and engineering knowledge**
- **Analysis (A) – creatively working with available data and engineering tools and fundamental knowledge to correctly solve basic problem**
- **Design (D) – being able to perceive the best solution for both small scale and large scale project by involving all required basic problems**
- **Ethics, Safety, Society and Environment (ESSE) - giving appropriate consideration to matters pertaining to professionalism and ethics, safety, local and global society and the environment**
- **Work skills (S) – being and effective communicator and effective member of a team and to appreciate the need to continuously acquired skills and abilities**

There are 12 POs for KOE:

1. **Engineering Knowledge (T)** - Apply knowledge of mathematics, sciences, engineering fundamentals and **specialization to solve complex engineering problems.**
2. **Problem Analysis (T)** – Identify, formulate, perform relevant literature review and **analyze complex engineering problems**, and reaching substantiated conclusions using **first principles of mathematics, natural sciences and engineering sciences**.
3. **Design/Development of Solutions (A)** – Design solutions whilst **exhibiting innovativeness**, for complex engineering problems and design systems, components or processes that meet specified needs; **with appropriate consideration of cost, sustainability issues, environmental impact, public health and safety, engineering ethics as well as cultural and social needs**
4. **Investigation (D) - C**onduct investigation on complex problems whilst **displaying creativity**, by using research-based knowledge and method, including design of experiments, **analysis and interpretation of data**, and synthesis of information to provide valid conclusions.
5. **Modern Tool Usage (A & D) -** Create and apply appropriate techniques, resources and **modern engineering/IT tools**, which includes making prediction and modelling of the complex engineering activities with understanding of limitations.
6. **The Engineer and Society (ESSE)** - Apply reasoning based on contextual knowledge to **assess societal, health, safety, legal, cultural, contemporary issues**, and the consequent responsibilities relevant to professional engineering practices

7. **Environment and Sustainability (ESSE)** - Understand the impact of professional engineering solutions in **societal, global, and environmental contexts** and demonstrate knowledge of and need for sustainable development.
8. **Ethics (ESSE)** –Apply professional ethics with **Islamic values** and commit to responsibilities and norms of professional engineering code of practices.
9. **Communication (S)** - **Communicate effectively within the engineering** community and with the society at large, which include but not limited to writing effective reports and documentation, **delivering effective presentation** as well as giving and receiving clear instructions.
10. **Individual and Team Work (S) -** Able to function effectively both as an individual or member of a team, or a **leader in a diversified multi-disciplinary** team settings.
11. **Life Long Learning (S) -**Recognize the need for, and have the preparation and ability to engage in independent and **life-long learning** in the broadest context of technological change.
12. **Project Management and Finance (S) -** Demonstrate and apply engineering management and financial principles into one's work which include being **an effective member/leader in projects** with multidisciplinary settings and identify opportunities of **entrepreneurship**.

What are PEOs of KOE ?

1. **Graduates who advance in career and professional standing nationally or internationally based on leadership and/or technical expertise.**

2. **Graduates who demonstrate moral and professional commitment for the betterment of society.**

3. **Graduates who engage in entrepreneurial activities that apply engineering knowledge and technical skills.**

4. **Graduates who engage in life long learning through postgraduate education and/or continuous professional development.**

Why we have POs ?

- **At KOE, we are practicing Outcome Based Education (OBE).**
- OBE emphasizes 'Student-Centered Learning (SCL)'.
- In SCL the focus of teaching and learning is **not what we teach** but **what we would like our students to learn** and **how we can help them achieve** that.
- Teaching and assessment at KOE are designed and implemented to align to these outcomes.
- **We concern about what YOU LEARN !**
- We achieve this by having 'course learning outcomes (CLO)' for all courses at KOE. CLOs are mapped to 'Programme outcome'.
- Achievement of CLO is measured through course assessments.
- Continuous Quality Improvement (CQI) is practiced at KOE to improve achievement of CLO and PO.

Notes for Students

- Know KOE's Programme Outcomes and Programme Objectives.
- For each course, know the Course Learning Outcomes. This gives you an idea of the knowledge and skills expected from a particular course.
- Be more proactive in the learning process to acquire the Learning Outcomes of subjects.
- Demonstrate through the assessment methods that the required skills and knowledge have been acquired.
- Attain the Programme Outcomes and Programme Objectives as a whole during the entire programme.
- Give constructive feedbacks on the programme/course/academic staff to obtain accreditation.

Course title

Embedded System Design

Course Objectives

1. Introduce students the concept of embedded systems and the related design issues.

2. Expose students to methods of developing embedded systems for Mechatronics applications.

3. Familiarize students with techniques to build the hardware elements of an embedded system.

4. Expose students to the usage of embedded systems for Mechatronic applications in the industry.

5. Foster the spirit of team work in the design process.

Learning Outcomes

Upon completion of the course students should be able to:

- Interface a microcontroller to a variety of analog and digital input and output devices.
- Program a microcontroller to solve an engineering problem.
- Write and troubleshoot C code and assembly code for a microcontroller.
- Analyze a problem to determine appropriate microcontroller use.

Pre-requirements

1. ECE 1322 Programming for Engineers
   - Please review C programming

2. MCT 2333 Digital Logic Design
   - Please review flip-flops, sequential logic gates, counters, adder, ALU

3. MCT 3235 Microcontroller Based Systems
   - Please review the entire course

Course Structure

- **Evaluation Method**
  - Quizzes 10%
  - Assignments/Projects 20%
  - Midterm Exam 30%
  - Final Exam 40%

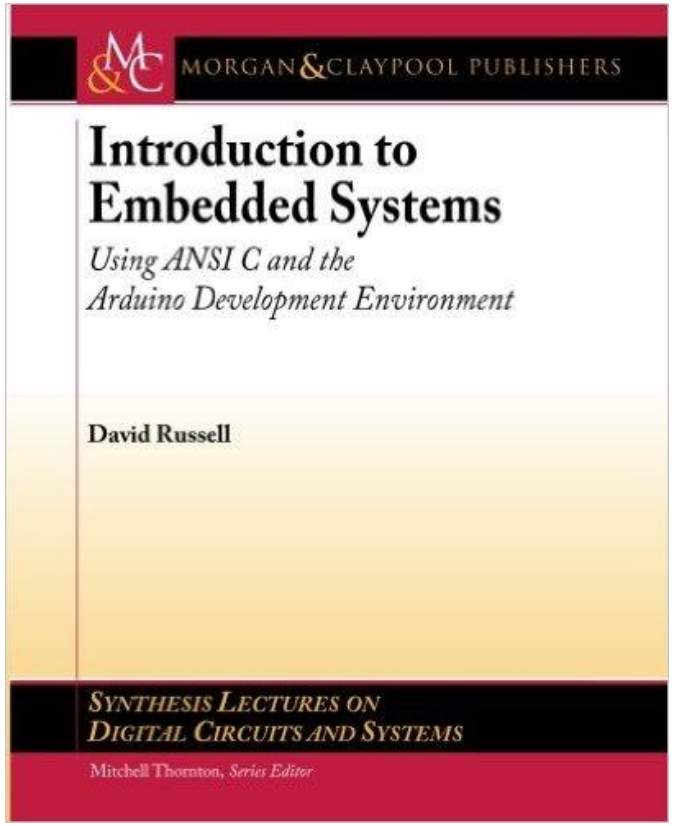
Course Outline

- Course outline can be acquired from iTaleem.

Required Acquisitions

Book

David Russell, (2010), *Introduction to Embedded Systems: Using ANSI C and the Arduino Development Environment*, Morgan and Claypool Publishers

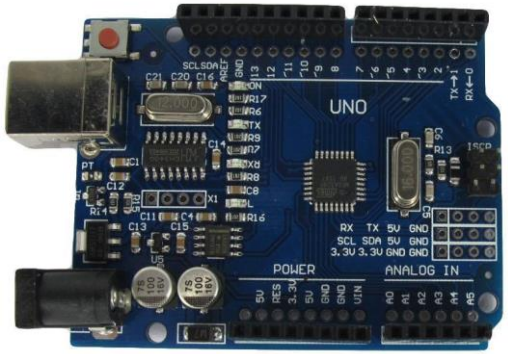


Required Acquisitions

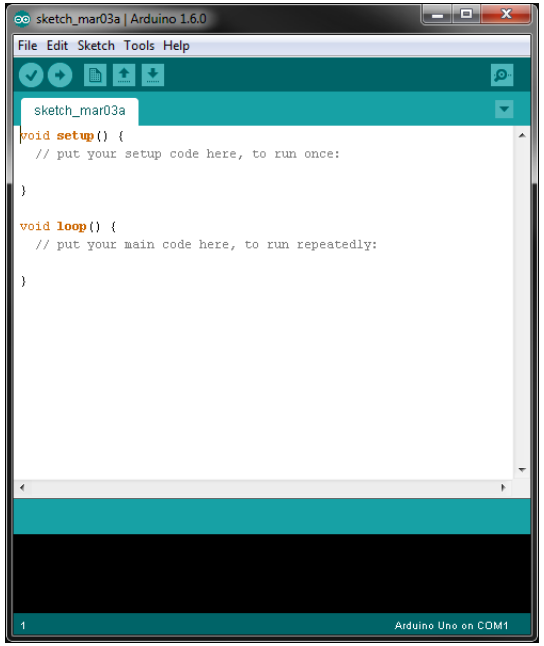
Arduino UNO R3

Original Arduino UNO R3

Arduino compatible boards can be purchased for less than $5 on Ebay



Required Acquisitions



IDE

One of the followings:

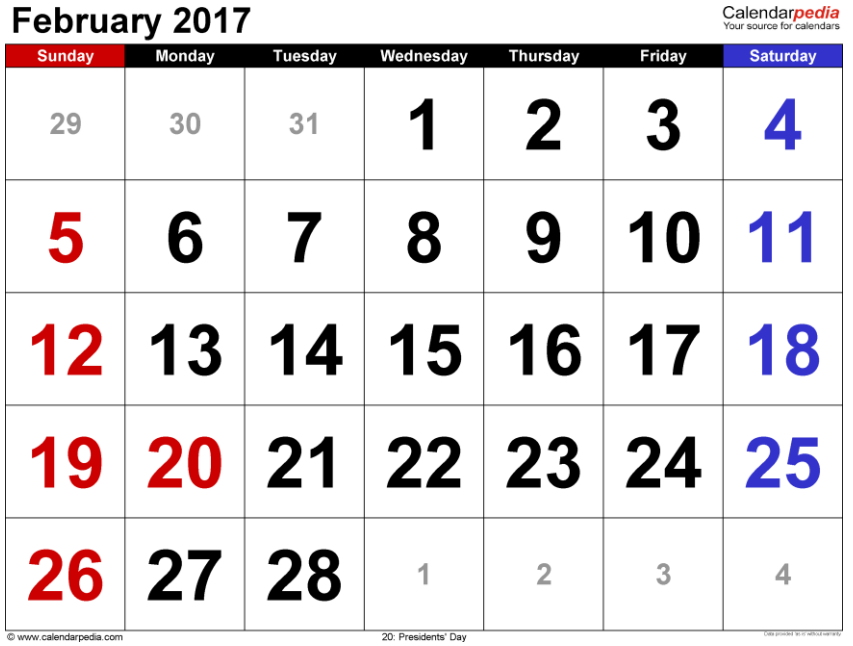
1. **Arduino**
   *https://www.**arduino**.cc/en/main/software*
   Free and run on Windows, Mac and Linux
   Very limited. No debugging capabilities.
   Okay for small projects

2. **Atmel Studio**
   http://www.atmel.com/microsite/atmel-studio/
   Free and runs only on windows
   Limited to AVR chips
   Very powerful

3. **Visual Studio**
   https://www.visualstudio.com/downloads/
   Free (community version) and runs only on windows
   Very powerful.
   Supports multiple languages (C, C++, C#, F#, Python, Ruby, Visual Basic, R, Perl, any many more!)
   It an compile projects into HEX files and load on any MCU.

Midterm date

- 16th March 2017
- 5:15 pm to 7:15pm
- Exam Hall 2



February 2017

Calendarpedia
Your source for calendars

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	1	2	3	4

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20: Presidents' Day

March 2017

Calendarpedia
Your source for calendars

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
26	27	28	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1

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Assignments/Mini-projects

- There will be programming assignments to be done individually.
- There will be 1 term mini-project to be done in groups.

  The project list will be released next week.

  Consult with me in advance if you want to do your own topic.

Student Disciplinary Rules

- Please read http://www.iium.edu.my/legaladviser/articles-1

Attending lectures	5.	Where a student is required to attend any lecture, tutorial, class or other instruction relating to his course of study, he shall not absent himself there from without the prior permission of the Dean of the Kulliyyah, the Head of the Department, or the Director of the Centre/Division, as the case may be, unless the circumstances do not permit such prior permission to be obtained and there is reasonable cause or excuse for the absence, in which case the student shall, as soon as possible thereafter, satisfy the Director or the Head, as the case may be with regard to the absence and obtain approval in respect thereof.

Modesty of attire in accordance with the University Dress Code

27. (1) *Muslim* students are expected to dress in a manner considered proper by the *Shariah*.

(2) Non-*Muslim* students may adopt the *Islamic* dress if they so desire. Otherwise they should dress in accordance with the University Dress Code. **Such mode of dress shall also be decent, neat and clean.**

(3) Any student who is inappropriately attired will be barred altogether from entering all academic and administration buildings and shall be guilty of a disciplinary offence.

An offence under this rule is a compoundable offence and shall be dealt with in accordance with the Rule 33 herein.

Prohibition against plagiarism	8.(1)	A student shall not plagiarise any idea or intellectual property expressed in material form, writing or data, of another person and claimed that the work, writing, data or invention is the result of his/her own findings or invention or any intellectual property right.

Appearance and conduct during examinations	6. (1)	Where a student's course of study entails his appearance for an examination and he is not otherwise debarred from appearing for such examination, he shall not fail to appear for such examination without the prior permission of the Dean of the Kulliyyah, or Head of the School, or the Head of the Institution, as the case may be unless the circumstances do not permit such prior permission to be obtained and there is reasonable cause or excuse for the non-appearance, in which case the student shall, as soon as possible there after satisfy the Dean or the Head, as the case may be with regard to the absence and obtain approval in respect thereof.

Attendance

- 10% missed without excuse = warning letter
- 20% missed without excuse = barring letter

Attendance

- Attendance will be taken using matric cards

- According to IIUM students' rules and regulations, it is compulsory for students to wear matric card all the time

Section B 1.1

All Students are required to display on their upper dress/shirt their respective Students' Identity cards at all material times whilst in University's premises except when attending sports activities.

An offence under this Order is a compoundable offence and shall be dealt with in accordance with the procedure in Rule 34 of the Students' Discipline Rules.

Missing lectures

- Kindly scan excuse letters into **PDF files** and e-mail me for the purpose of documentation.
- Hardcopies will not be accepted because they often get lost.
- Images or snapshots of excuse letters will not be accepted unless they have been captured pretty straight without any distortion, cropped and converted into PDF using some apps. There is a great app called *Cam Scanner*.

Valid MC

الجامعة الإسلامية العالمية ماليزيا
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
يونيورسيتي إسلام أنتارابغسا ملسيا

No : 171505

HEALTH & WELLNESS CENTRE
MEDICAL CERTIFICATE

This is to certify that I have examined [redacted]

Matric/Staff/IC No. [redacted]

of Kulliyyah/Department ENGINEERING

on 10/5/2016 and has been advised the following:

1) To stay off work/to take complete bedrest for a period of ONE(1) days with effect from/on 10/5/2016 to —

2) To be given Light Duty for a period of — days with effect from/on — to —

3) To report to the clinic for review on.....

10/5/2016
Date

DR. SUHAIMI MOHAMAD DAUD
MD (UKM), MPH (Phil.)
Medical Officer (UD 53)
MMC NO: 27379
Health & Wellness Centre
International Islamic University Malaysia
Doctor's Signature & Chop

Tel : 03-6196 4444 (Gombak), 03-7955 3581 (PJ)

Invalid MC

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TIME SLIP

BR./~~SR.~~ [redacted]

MN /SN /IC /PASS [redacted] REGISTER NO: 23 ATTENDED THIS CLINIC

FROM 8.30 (AM)/PM TO 9.30 (AM)/PM ON 21/4/2016

DR. MD. S[redacted]
MD (UKM)
Medical Officer
MMC NO: 2554[redacted]
Health & Wellnes[redacted]
International Islamic[redacted]
Doctor's Signature & Stamp

My expectations

- Punctuality
- Good attendance record

Questions?